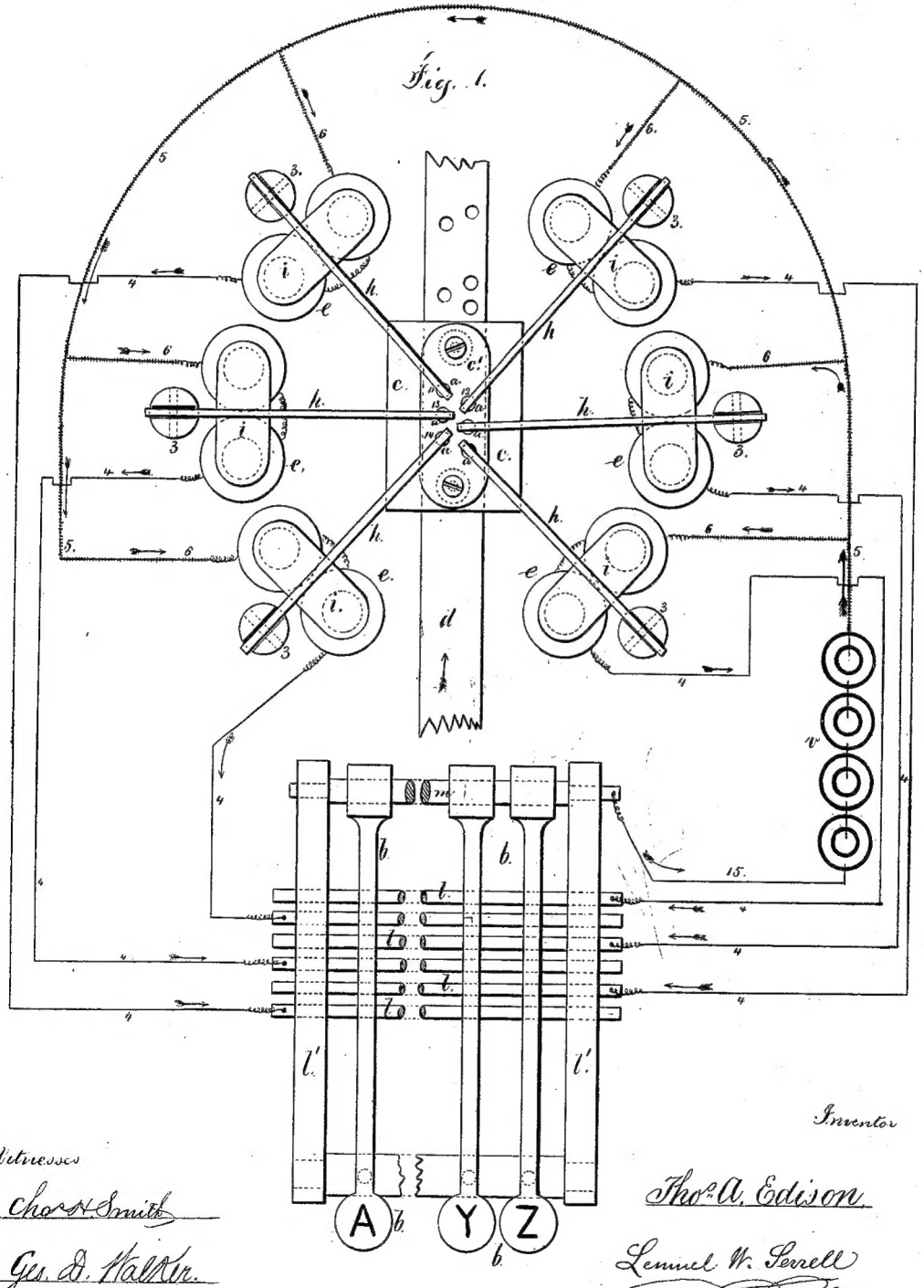
2 Sheets--Sheet 1.

T. A. EDISON.

Perforators for Automatic Telegraphs.

No. 141,775. Patented August 12, 1873.

Fig. 1.



Witnesses

Chas. A. Smith

Geo. D. Walker.

Inventor

Thos. A. Edison

Lemuel W. Serrell

Atty.

2 Sheets--Sheet 2.

T. A. EDISON.

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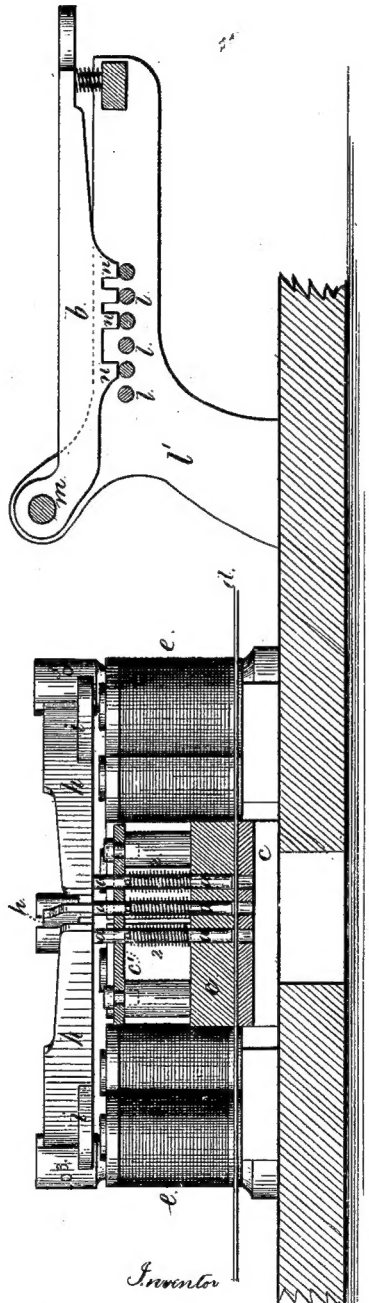

Fig. 2.

Witnesses:
Chas. H. Smith
Geo. D. Walker.

Inventor
Thos. A. Edison,
L. W. Serrell Atty.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF NEWARK, NEW JERSEY, ASSIGNOR TO HIMSELF AND GEORGE HARRINGTON, OF WASHINGTON, D. C.

IMPROVEMENT IN PERFORATORS FOR AUTOMATIC TELEGRAPHS.

Specification forming part of Letters Patent No. **141,775**, dated August 12, 1873; application filed March 13, 1873.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Newark, in the county of Essex and State of New Jersey, have invented an Improvement in Machines for Perforating Paper for Use in Automatic Telegraphy, of which the following is a specification:

In Letters Patent No. 121,061, granted to me, a device is shown for perforating paper in which the punches are moved by power applied to finger-keys acting through cams and slide-bars.

My present invention relates to employing electro-magnetism as the motor to project the punches, so as to render the work of operating the machine less fatiguing to the hand and arm of the operator than if the power to move said punches is applied by the hand to the keys; and by this improvement I dispense altogether with the cams and slide-bars of aforesaid patent.

I employ an electro magnet or magnets to actuate each punch through an armature and lever, and the connections to the magnets are arranged so that by depressing a finger-key the circuit is closed to the proper magnet or magnets, and they, by their levers, move the punch or punches, and the paper is perforated with the character corresponding to that of the depressed finger-key.

In the drawing, Figure 1 is a plan, and Fig. 2 is a vertical section, of my improved machine.

a a represent the punches (and of these there should be ten) for making the characters composing the Morse alphabet. I have shown but six to avoid duplication of parts, and for the same reason only three keys of the horizontal range of finger-keys *b b* are represented. The punches *a a* are placed in two rows, and move vertically in the die *c* and guide-plate *c'*, and are kept raised from off the strip of paper *d* by the springs 2 2 when not acted upon by the levers *h h* of the electro-magnets *e e*.

The paper is drawn through an opening in the die *c*, beneath the punches, by any suitable feeding device; but, as this forms no part of my invention, it is not represented in the drawing.

The electro-magnets *e e* for actuating the punches are supported upon the bed of the machine, and are preferably arranged in a circle, with their levers *h h* radiating from the group of punches, as shown in Fig. 1, so as to economize space and allow of said levers acting upon their respective punches without risk of interfering with each other. Each lever is provided with an armature, *i*, and moves upon a fulcrum, 3; and said lever may either rest upon its punch *a* or be connected to it by a pin and slot. Beneath the range of finger-keys *b b* there is a range of metallic bars or rods *l l*, supported and insulated in the frames *l' l'*; and there is the same number of bars *l* as there are punches *a*. Each bar *l* is in metallic connection with its magnet *e* by the wire 4, and the battery *v* is connected to all the magnets *e* by the wire 5 and branches 6 6. The finger-keys *b b* are pivoted upon the rod or shaft *m*; and upon the under side of each key there are one or more projections, *n*, each contiguous to a bar, *l*; and these projections are different in number and position upon the various keys, and arranged so that when a key is depressed and its projections in contact with the bars *l* the circuit is closed to such magnets *e* as actuate those punches that produce a character corresponding with that of the depressed key. Thus the key shown depressed in Fig. 2 is provided with four projections, *n*, and the circuit is closed to the four magnets that actuate the punches marked 11, 12, 13, and 14, and the character made is three perforations in one line and one in the other line, the whole representing a long dash and dot.

When a key, *b*, is depressed the current from the battery *v* passes to the magnet or magnets *e e* by the wire 5 and branch or branches 6 6, and from said magnets, by the wire or wires 4, to the bar or bars *l*, finger-key *b*, shaft *m*, and wire 15, back to the battery.

By this arrangement of mechanism the punches are operated by the power of electro-magnets, and the finger-key only performs

the duty of closing the circuits through said magnets.

The arrangement of the electro-magnets may be varied, and they may be more or less direct acting upon the punches, and positioned according to the arrangement and number of the punches.

I claim as my invention—

A group of punches for perforating telegraphic paper, actuated by a separate electro-magnet to each punch, in combination with the circuit-bars *l* and a range of finger-keys, for selecting the circuits that are to be closed to perforate the paper in accordance with the character upon the key, substantially as set forth.

Signed by me this 7th day of March, A. D. 1873.

THOMAS A. EDISON.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.